40. On some new Parasitic Mites.

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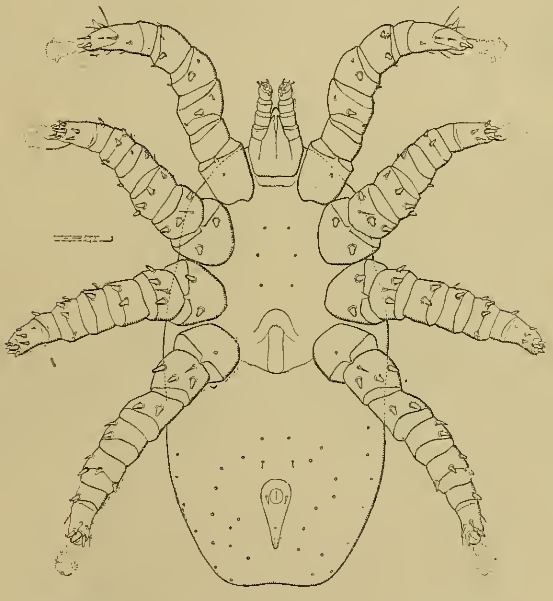
(Text-figures 16-43.)

The present paper deals with various parasitic Acari, mostly belonging to the family Gamasidæ, including eight new species of *Liponyssus* and a new species of *Rhinonyssus*, also two new genera closely allied to *Rhinonyssus*. A new Tarsonemid mite belonging to the genus *Podapolipus* is also described, and a new "Red Spider" (*Paratetranychus trinitatis*) found on grapes at Trinidad.

Text-figure 16.



Rhinonyssus novæ-guineæ, sp. n., ♀. Ventral view.

Genus Rhinonyssus Trouessart.

Rhinonyssus novæ-guineæ, sp. n. (Text-fig. 16.)

♀. Abdomen not elongated. The spinules or hairs usually present on the venter in this genus have practically disappeared, being mostly replaced by exceedingly minute and inconspicuous circular pores. *Anal plate* distinct, being elongate pyriform; it is furnished with a pair of hairs. Second and third coxæ each with a pair of very stout cones or tubercles; the other segments of the legs are provided ventrally with similar stout cones and also a few spinules.

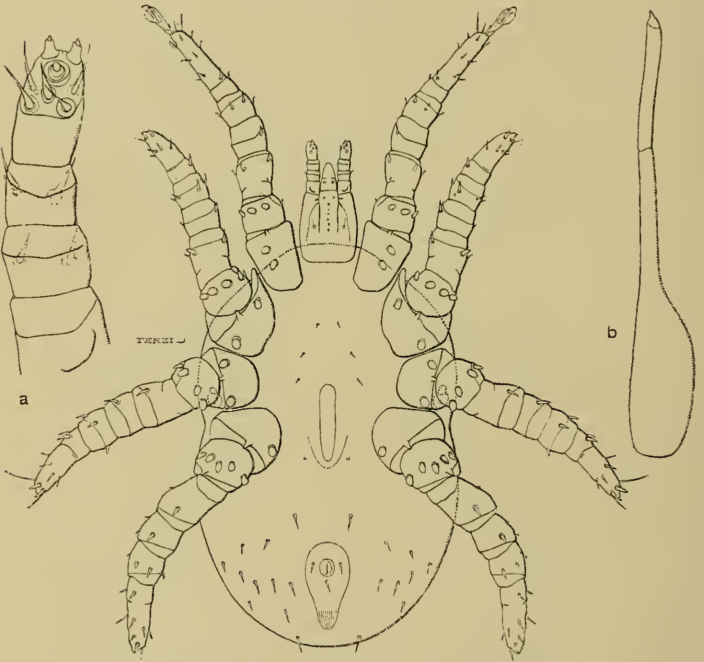
Length (including capitulum) ·93 mm.

Host: A bird (*Craspedophora magnifica*), New Guinea. Professor Trouessart's collection.

RHINONYSSOIDES, gen. nov.

Closely allied to *Rhinonyssus* Trouessart, but the chelicera is very differently shaped, consisting of a short stout basal portion and a long thin distal style, the latter has a very minute lobe near the distal end, which is very slightly curved, being in the form of a minute claw-like denticle (text-fig. 17 *b*).

Text-figure 17.



Rhinonyssoides trouessarti, sp. n., ♀. Ventral view.
a. Palp from below. b. Chelicera.

RHINONYSSOIDES TROUESSARTI, sp. n. (Text-fig. 17.)

♀. *Body* shaped as in *Rhinonyssus*, the abdomen not elongated however. Anterior hairs on venter short but quite fine. A number of hairs are situated posteriorly on the venter; they are longer than the anterior pairs of hairs and are fairly slender, the basal half being only slightly thickened, whilst the apical half is fine. *Anal plate* present, being pyriform in shape and furnished with three hairs as in *Liponyssus* etc. First free segment of palp apparently with a process. There is a median row of minute denticles on the ventral surface of the base of the capitulum. Anteriorly the second coxa is produced to form a stout process or spur rather similar to that present in the same position in *Liponyssus* but thicker and blunter. The spinules or hairs present on the proximal segments of the legs in *Rhinonyssus* are replaced by curious globular structures in this species; a pair being situated on each of the first three coxæ and a single globule on the fourth coxa. Trochanter of first leg with two chitinous globules ventrally, second and third trochanters each with three globules and a short pointed spinule, fourth trochanter with four globules and a short pointed spinule. Distal segments of legs furnished with short pointed spinules. Claws of first legs only slightly curved (the claws of the other legs are missing in the unique specimen).

Length (with capitulum) ·92 mm.

Host: A bird (*Sphecotheres maxillaris*), Australia. Professor Trouessart's collection.

NEONYSSUS, gen. nov.

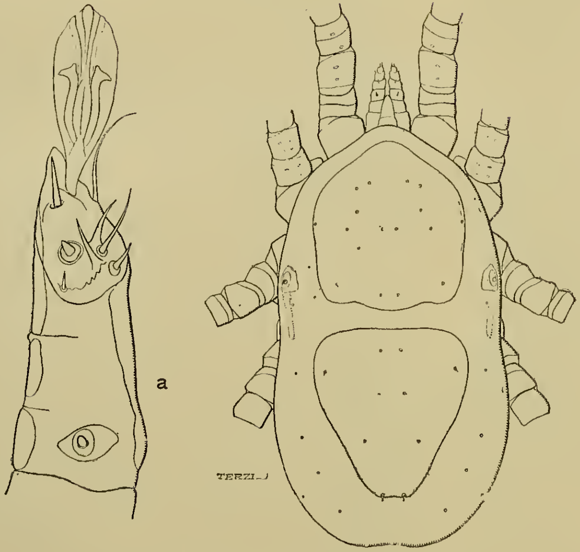
Allied to *Liponyssus* but with the palpi shorter, the sternal plate longer than wide, and the hairs on the body and legs very few in number. Differing from *Rhinonyssus* in the presence of two dorsal shields (an anterior and a posterior one), instead of only a single anterior shield.

NEONYSSUS INTERMEDIUS, sp. n. (Text-figs. 18, 19.)

♀. Two *dorsal shields* both fairly large, their surface reticulated and with numerous punctations, posterior shield with the hinder end rather bluntly rounded off. *Sternal shield* longer than wide, apparently there are no hairs on it, but there are three minute dots or circles on each side. *Genito-ventral plate* unusually short. *Anal plate* similar to that of *Liponyssus*, being pear-shaped. *Palpus* short, being very similar to that of *Rhinonyssus*. Apparently there is no median groove on the ventral surface of the capitulum. With the exception of the pair on the anal plate there seem to be no spines or hairs on the ventral surface. *Peritreme* opening dorsally as in *Rhinonyssus*. Legs rather short, apparently only the distal segments are furnished with hairs, a dorsal hair on the tarsus of the third leg being longer than the others, but still it is not very long; there is also a pair of distal spines on the ventral surface of this segment. Except for the dorsal spur on the anterior surface of the second coxa which is present but quite short (obsolete), the coxæ are without hairs or spines.

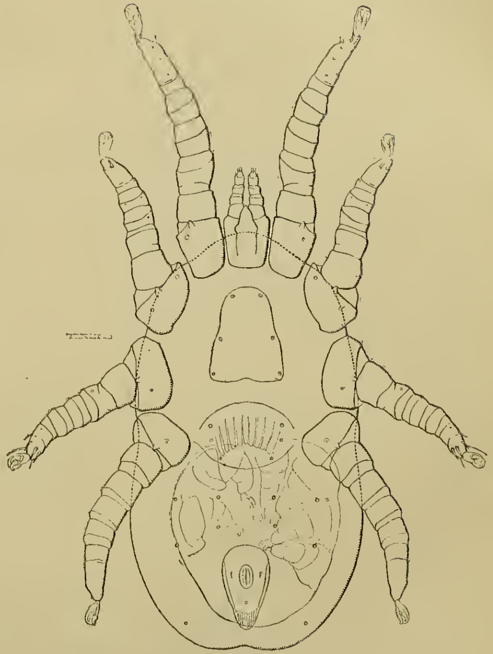
It is possible that some of the hairs on the body and limbs of

Text-figure 18.



Neonyssus intermedius, sp. n., ♀. Dorsal view.
a. Tarsus of first leg from above.

Text-figure 19.



Neonyssus intermedius, sp. n., ♀. Ventral view.

the single specimen have been destroyed by the caustic potash used in preparing it. It seems probable, however, that this absence is natural for in general appearance the mite is very like a *Rhinonyssus*, and the spines may be reduced or almost suppressed in the latter genus. There is a fully-developed larva inside the specimen and it resembles the parent in having only a few hairs on the legs. The claws of this larva are well developed and strongly curved.

Length (with capitulum) ·53 mm.

Host: The above description is based on a single specimen labelled "Sur un Oiseau de Madagascar." Professor E. L. Trouessart's collection.

Genus LIPONYSSUS Kolenati.

The species of this genus are found both on birds and mammals. Only the species that I have been able to examine personally are included in the key given below. A number of species are not in our collection, and these have been left out. Two dorsal shields are present in the nymphal stages of *Liponyssus*, whereas there is usually a single undivided dorsal shield in the adults. In the adult females of a few species, however, there are two dorsal shields as in the nymphs: for instance in *L. viator*, sp. n., where they are shaped exactly as in the nymphs of certain other species. The adult females can always be distinguished by the presence of separate sternal and genito-ventral plates on the venter, and by the delicate fan-shaped or semi-circular genital operculum situated at the front end of the latter plate.

Key to the females of the species of the genus *Liponyssus* present in the British Museum Collection :—

1.	Dorsum with two shields	2.
	Dorsum with a single shield	8.
2.	Posterior of the two dorsal shields very small	3.
	Posterior of the two dorsal shields fairly large	4.
3.	Anterior dorsal shield small and separated from the minute posterior shield by a considerable space ...	*L. serpentium* Hirst.
	Anterior dorsal shield rather long and only separated from the posterior one by a short space	*L. natricis* Gerv.
4.	Sternal plate quite short, the two posterior hairs on it long. Anterior spur on second coxa short............	*L. viator*, sp. n.
	Sternal plate longer	5.
5.	Posterior margin of sternal plate strongly chitinised .	6.
	Posterior margin of sternal plate weakly chitinised...	7.
6.	Posterior dorsal shield with only three pairs of fairly long hairs..	*L. chiropteralis*, nom. nov.
	Posterior dorsal shield with a number of fairly long hairs	*L. nyassæ*, sp. n.

7.	Sternal plate with strong reticulate markings. A few of the hairs at the posterior end of the body longer than the other hairs	*L. biscutatus*, sp. n.
	Sternal plate smooth. Hairs at posterior end of body not much longer than the others	*L. javensis* Oudmns.
8.	Genito-ventral plate truncate posteriorly and furnished with three pairs of hairs	*L. madagascariensis*, sp. n.
	Genito-ventral plate rounded off or pointed posteriorly	9.
9.	Sternal plate with a pair of well-defined circular stigma-like markings. Genito-ventral plate with three pairs of hairs	*L. sternalis*, sp. n.
	Sternal plate without any circular markings. Genito-ventral plate with only a single pair of hairs	10.
10.	Sternal plate with the posterior margin thickened	*L. æthiopicus*, sp. n.
	Sternal plate not thickened posteriorly	11.
11.	Coxæ of legs furnished with distinct dentiform spurs.	12.
	Coxæ of legs without any spurs, except an anterior dorsal one on the second coxa	18.
12.	Coxa of second leg with a very large curved outer spur	*L. creightoni* Hirst.
	Coxa of second leg without any very large outer spur.	13.
13.	Coxa of second leg with two posterior spurs	*L. sciurinus*, sp. n.
	Coxa of second leg with only one posterior spur	14.
14.	Second coxa with a large curved inner (anterior) spur ventrally. Second tarsus usually ending in two spurs, one of which is very stout	*L. liberiensis* Hirst.
	Second coxa without any anterior inner spur ventrally.	15.
15.	Only the anterior dorsal spur of the second coxa and a little outer posterior spur on the third coxa present	*L. blanchardi* Trouessart.
	Several other spurs present on the coxæ as well	16.
16.	Posterior end of dorsal scutum rounded off or blunt	*L. arcuatus* C. L. Koch and *L. carnifex* C. L. Koch.
	Posterior end of scutum pointed	17.
17.	Second coxa with only a very short rounded spur posteriorly	*L. confucianus* Hirst.
	Second coxa with a large pointed spur posteriorly	*L. macedonicus*, sp. n.
18.	Posterior end of genito-ventral plate rather wide and blunt or rounded off	19.
	Posterior end of genito-ventral plate narrower and usually pointed	21.
19.	Anal plate rather angular in shape	*L. flavus* Kolenati.
	Anal plate pear-shaped, the sides being curved	20.
20.	Size larger. Dorsal shield elongated and rather narrow. Sternal plate comparatively long and without any distinct markings. Peritreme rather short	*L. ellipticus* Kolenati.
	Size smaller. Dorsal shield wider. Sternal plate shorter and with a few deep curved little impressions on each side in the anterior angles. Peritreme long.	*L. granulosus* Kolenati.

21.	Sternal plate with three pairs of hairs	22.
	Sternal plate with two pairs of hairs	23.
22.	Dorsal shield narrow, especially posteriorly (parasitic on rats)	*L. bacoti* Hirst.
	Dorsal shield wider (parasitic on hen)	*L. bursa* Berlese.
23.	Hairs on dorsum only slightly curved	*L. silviarum* Can. & Fanz.
	Hairs on dorsum very distinctly curved	24.
24.	Dorsal shield rather short. Anal plate rather wide and short	*L. lacertinus* Berlese.
	Dorsal shield more elongated. Anal plate narrower and longer	*L. saurarum* Oudmns.

LIPONYSSUS NATRICIS Gerv.

Liponyssus arabicus mihi described from a female specimen found on a lizard (*Agama adramitana*) is apparently identical with *L. natricis* Gerv. I have examined examples of the latter found on a snake at Florence kindly sent me by Prof. Berlese. A very minute posterior shield is present on the dorsum in the adult female, and Berlese seems to have overlooked it. It is very similar in shape to that present in *L. serpentium* mihi, but is longer and only separated from the anterior dorsal shield by a short space, whereas in the *L. serpentium* the two dorsal shields are widely separated from one another.

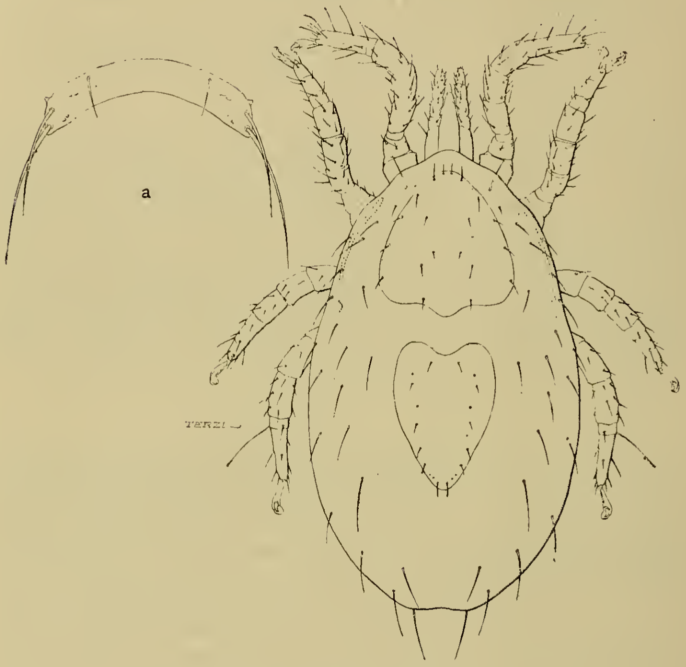
LIPONYSSUS VIATOR, sp. n. (Text-fig. 20.)

♀. There are two *dorsal shields*, shaped as shown in figure, the anterior one being slightly produced in the middle posteriorly, whilst the posterior one has the anterior margin rather strongly concave; posterior dorsal shield shaped rather like a tongue, the lateral margins being at first convex and then narrowing to form the bluntly pointed posterior end. Hairs on dorsal shields short, some of the hairs on the margins of the anterior dorsal shield are a little longer, and the hairs of the terminal pair on the posterior shield are longer than the others on its surface. Lateral hairs on body fairly long and the posterior hairs on uncovered part of dorsum very much longer than those on the shields. *Sternal plate* very short, being in the form of a narrow transverse strip; it bears three pairs of hairs, those of the anterior pair are much shorter than the posterior ones, the latter being much longer than usual. *Genito-ventral plate* narrow, the posterior end rather blunt. *Anal plate* pear-shaped. *Peritreme* reaching as far forwards as the middle of the second coxa or somewhat further forwards. A minute and inconspicuous spine or spur is present on the anterior surface of the second coxa, but it is much shorter than in most species of *Liponyssus*; the other coxæ apparently are without spurs. It is not easy to make out the denticle on the first free segment of the palp in the specimens from *Cypselus affinis*, but it is quite distinct in the example from *Gecinus vaillanti*, being sharply pointed.

Length of body (not including capitulum), ♀ ·65–·87 mm.

Host: Several specimens from nests of *Cypselus affinis*, Calcutta, collected by C. Paiva (28. vi. 1909) and forwarded to me by Dr. Nelson Annandale. Also an example from *Gecinus vaillanti*, Tangier (May 1892), presented to the Museum by Dr. James Waterston.

Text-figure 20.



Liponyssus viator, sp. n., ♀. Dorsal view.
a. Sternal plate.

Note.—The specimen from *Gecinus vaillanti* agrees closely with those from *Cypselus affinis* in the structural details given above, but the posterior dorsal shield is rather more narrow, and the denticle on the first free segment of the palp distinct.

Liponyssus chiropteralis, nom. nov.

♀. Two *dorsal shields* are present, their surface being finely reticulated. The shape of these shields varies somewhat in specimens from different localities; the posterior one is tongue-shaped, its hinder end being narrowed and blunt. Hairs on the shields of moderate length; there are three pairs of these fairly long hairs on the posterior shield and also three or four pairs of very minute and inconspicuous hairs at its posterior end. Hairs on softer parts of body very numerous, of moderate length and rather thick. *Sternal plate* trapezoidal, its posterior margin is very much thickened, being strongly chitinised as in *L. æthiopicus* and *L. nyassæ*; anterior pair of hairs on it quite short, the other two pairs usually longer. *Genito-ventral plate* with the posterior end sharply pointed. *Anal plate* pear-shaped. *Peritreme* only reaching as far forwards as the middle of the second coxa or even shorter. First free segment of *palp* with a well-developed process. Second *coxa* with the anterior spur well-developed; apparently there are no other spurs or spines on the coxæ. Bristles on dorsal surface of legs very numerous and rather stout.

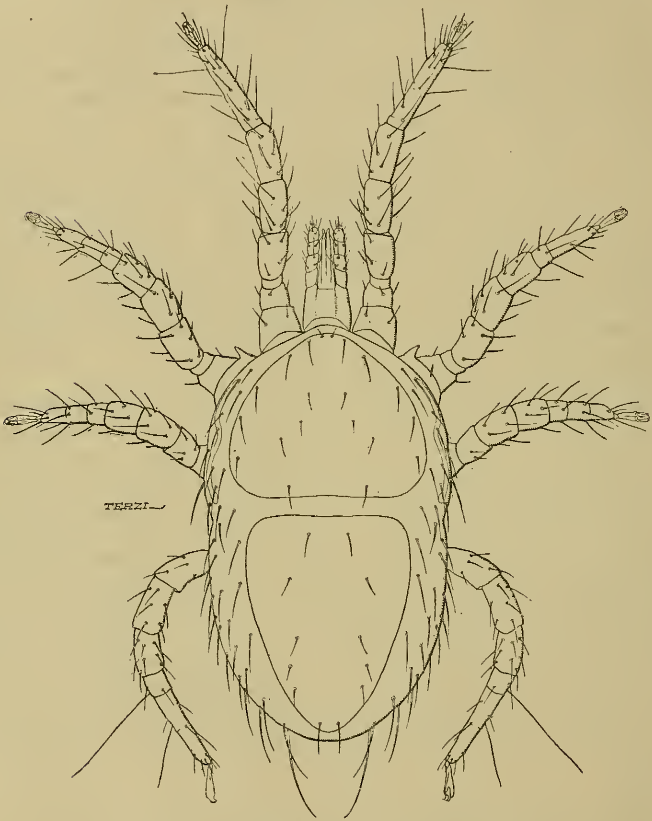
Hosts: Bats. On *Pipistrellus*, Ambleside, Windermere (11. iii. 1912) (*J. F. Cormack*); ex Dr. J. Waterston's coll. On *Myotis myotis*, Oristano, Sardinia (*Dr. A. H. Krausse*); ex Hon. N. C. Rothschild's coll. On bats, at Ain Sefra, S.W. Algeria (14. v. 1913); ex Hon. N. C. Rothschild's coll. Off *Ctenodactylus gundi*, Gorge of Tilaton, El Kantara; specimens collected by the Hon. L. W. Rothschild and Dr. E. Hartert. Also a specimen from a bat, Tabgka, Tiberias (*P. E. Schmitz*); ex the Hon. N. C. Rothschild's coll.

NOTE.—Canestrini, relying upon the colour of living specimens, considered this species of *Liponyssus* with two dorsal shields to be *L. arcuatus* C. L. Koch (see Prospett. Acar. Ital. i. pp. 120–121, 1885), and Berlese is also of this opinion in his Acari etc. Reprt. in Italia (Ordo Mesostigmata, p. 22, 1892). Oudemans gives the name *L. arcuatus* to quite a different species with an undivided scutum (see Arch. Naturg. Abt. A. Heft ix. pp. 68–75, 1913). According to this author the name of this species with two dorsal shields should be *L. musculinus* C. L. Koch—a mite found on the house-mouse (see Tijdschr. Ned. Dierk. Ver. (2) vii. p. 293, 1902). It is impossible to determine the two species said by Kolenati to have two dorsal shields, viz., *Steatonyssus periblepharus* and *S. brachypeltis* (see Sitzb. K. Akad. Wiss. Wien, xxxv. pp. 186 & 187, 1859). As it seems to be impossible to ascertain the real name of this mite, I propose the new name *L. chiropteralis* for it.

LIPONYSSUS NYASSÆ, sp. n.

♀. Two *dorsal shields* are present in this species, the anterior one being very wide; the posterior one is much narrower and shaped like that of *L. æthiopicus*, sp. n., and *L. chiropteralis*, being tongue-shaped and with the anterior margin distinctly concave. It differs from the posterior dorsal shield of *L. chiropteralis* in having a number of moderately long hairs on its surface instead of only three pairs as in that species. Hairs on uncovered (softer) part of dorsum numerous, stiff, of moderate length, and sharply pointed much as in *L. chiropteralis*. *Sternal plate* rather weakly chitinised except the posterior margin, which is very much thickened and slightly concave as in *L. chiropteralis* and *L. æthiopicus*; there are numerous fine transverse linear markings on its surface and the three pairs of hairs are long and fine. *Genito-ventral plate* with the posterior end rather bluntly pointed, and it has only one pair of hairs on it. *Anal plate* pear-shaped. Hairs on *venter* numerous, fine and of moderate length. *Peritreme* extending a little further forwards than the middle of the second coxa. First free segment of *palp* with a ventral process. With the exception of the well-developed anterior spur on the second coxa, the coxæ are without spurs or spines. *Legs* furnished with numerous fine hairs or setæ.

Text-figure 21.



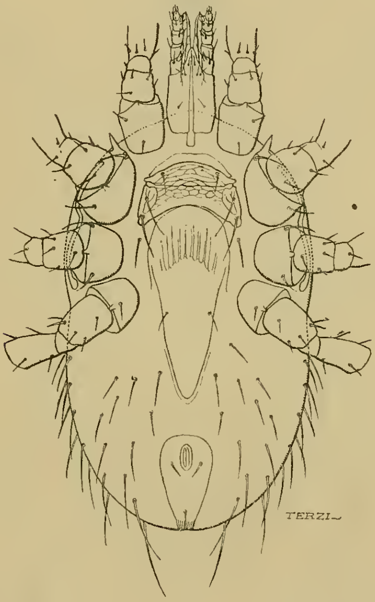
Liponyssus biscutatus, sp. n., ♀. Dorsal view.

Host: Elephant shrew, Chiromo, Nyasaland; ex Coll. of Imperial Bureau of Entomology.

Liponyssus biscutatus, sp. n. (Text-figs. 21, 22.)

♀. *Dorsal shields* two in number, both are fairly wide, the outline of the posterior one is shaped rather like a thimble or cone, the blunt apex of which is the posterior end. Hairs on scutum not numerous and arranged as shown in figure, those in the middle of its surface are short, but the ones on the margins of the anterior plate are longer. Hairs on softer part of dorsum much longer than those on the dorsal shields, a few at the posterior end of the body being considerably longer than the others. Hairs on venter fine and of moderate length. *Sternal plate* large and its surface is strongly reticulated; its posterior margin is concave; three pairs of hairs are present on it, the first pair being short and weak, the posterior pairs very long. *Genito-ventral plate* narrowed posteriorly to form a sharp point. *Anal plate* pyriform and rather longer than usual. *Peritreme* reaching as far forwards as the middle of the second coxa or slightly further. First free segment of the *palp* furnished with a strong pointed tooth-like process. Anteriorly the second coxa has the usual spur, otherwise the coxæ are devoid of spurs. Hairs on legs quite fine, none of them being spiniform.

Text-figure 22.



Liponyssus biscutatus, sp. n., ♀. Ventral view.

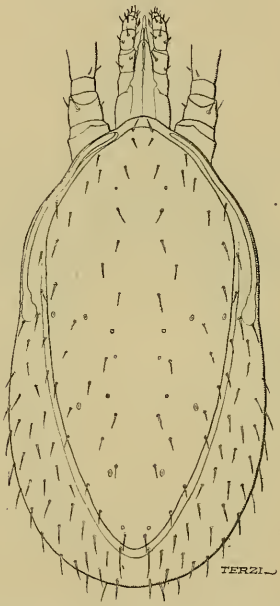
Length of body (not including capitulum) ·65 mm.

Host: *Dendropicus cardinalis*, South Africa.

LIPONYSSUS MADAGASCARIENSIS, sp. n. (Text-figs. 23, 24.)

♀. *Dorsal shield* shaped rather like that of *L. bursa* (see text-fig. 23), the hairs on its surface short, the terminal pair at the posterior end somewhat longer than the others. Hairs on the softer part of the *dorsum* numerous, they are short but mostly slightly longer than those on the shield. *Sternal plate* large, being longer than usual; it is trapezoidal in shape, the posterior margin being straight except in the middle where it is slightly concave; there are three pairs of hairs on it and they are rather short. *Genito-ventral plate* unusual in shape for a species of *Liponyssus*, for instead of being pointed or rounded off posteriorly it is truncated; also there are three pairs of hairs on it instead of only one pair, one pair being situated opposite the fourth coxæ, the two others at the posterior end of the plate, one of these pairs being placed on its posterior margin. *Anal plate* pear-shaped and more elongated than usual. *Peritreme* extending a little beyond the first coxa. Besides the usual dorsal spur, there is a ventral (inner) spine anteriorly on the second coxa, it is stout but curved. There is a similar anterior spine on the third coxa. Both the second and third coxæ are without any posterior spurs.

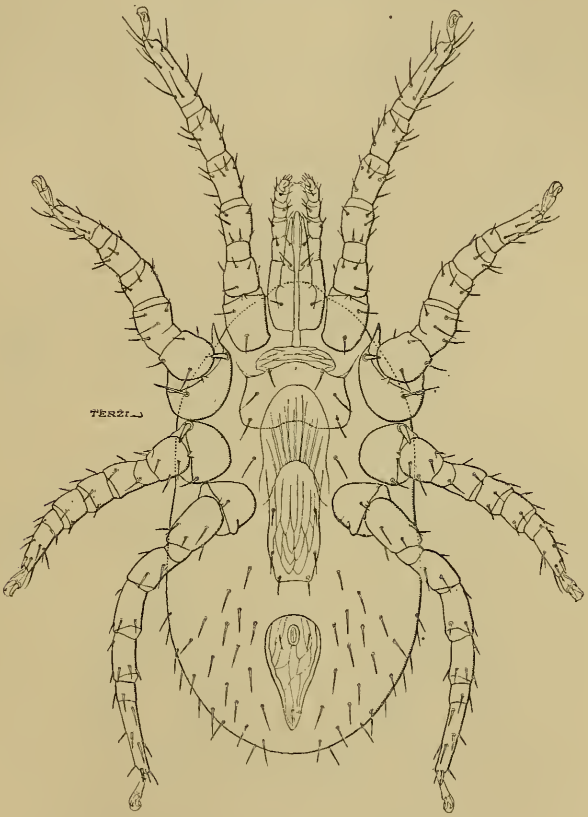
Text-figure 23.



Liponyssus madagascariensis, sp. n., ♀. Dorsal view.

There is, however, a short but blunt posterior spur on the fourth coxa. Legs furnished with hairs and bristles, there is a short spine ventrally at the distal end of the tarsi of the posterior legs.

Text-figure 24.



Liponyssus madagascariensis, sp. n., ♀. Ventral view.

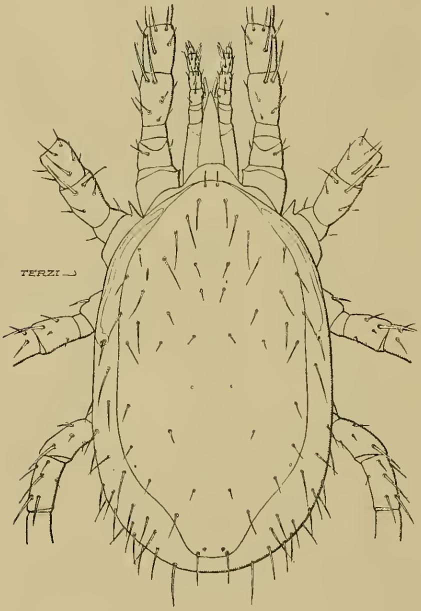
Length of body (not including capitulum), ♀ ·79–·96 mm.

Host: *Lemur mongoz* var. *albifrons*, Diego Suarez, Madagascar (*G. Melow*); ex the Hon. N. C. Rothschild's coll.

Liponyssus sternalis, sp. n. (Text-figs. 25, 26.)

♀. *Dorsal shield* large and undivided, it is much narrowed anteriorly, in the middle the sides are straight and parallel, posteriorly it is rather abruptly narrowed to form a short tail-like portion which is truncated posteriorly. Anterior hairs on scutum of moderate length and so are also two pairs at the posterior end, one pair being terminal, the rest of the hairs on its surface are very short. Hairs on soft uncovered part of dorsum of moderate length. *Sternal plate* trapezoidal in shape, its posterior margin slightly concave; on each side in the anterior angle there is a very well-defined circular mark consisting of an outer rim and a pitted interior; three pairs of hairs are present on the sternal plate and they are long and fine. *Genito-ventral plate* rounded off posteriorly and with three pairs of hairs on its surface, viz., the usual pair situated opposite the fourth coxæ and also two pairs at the posterior end of the plate, one of them being terminal. *Anal plate* large and pear-shaped. Hairs on venter very numerous and of moderate length. *Peritreme* extending forwards about as far as the middle of the first coxa. *Palp* ventrally with a lobe-like process on the first free segment as in *L. granulosus* etc. The usual anterior dorsal spur is present on the second coxa; there are also chitinous raised lines on the coxæ but no distinct spurs. There are numerous bristles on the legs, especially on the dorsal surface.

Text-figure 25.

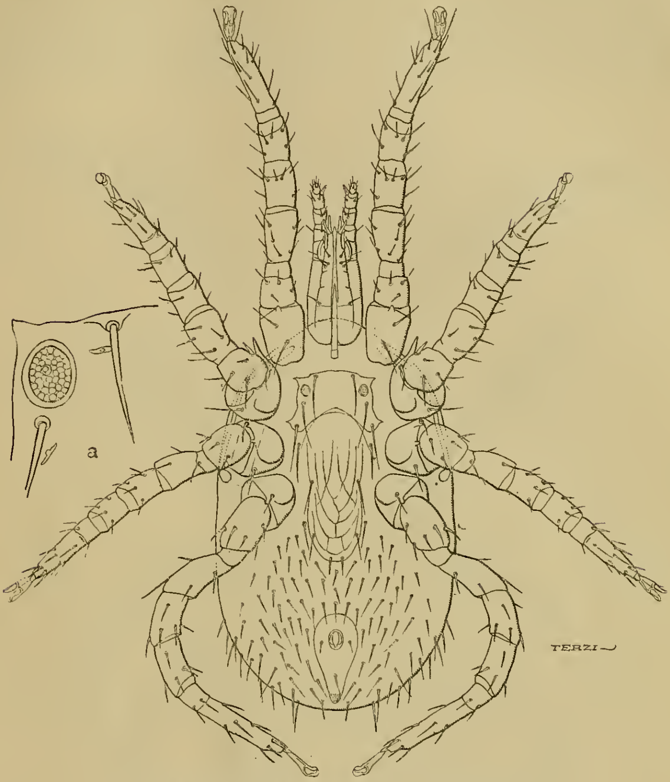


Liponyssus sternalis, sp. n., ♀. Dorsal view.

Length of body (not including capitulum) ·80 mm.

Host: A bat found in a cave near Lake Beshik, Salonika (27. v. 1918), Dr. James Waterston.

Text-figure 26.

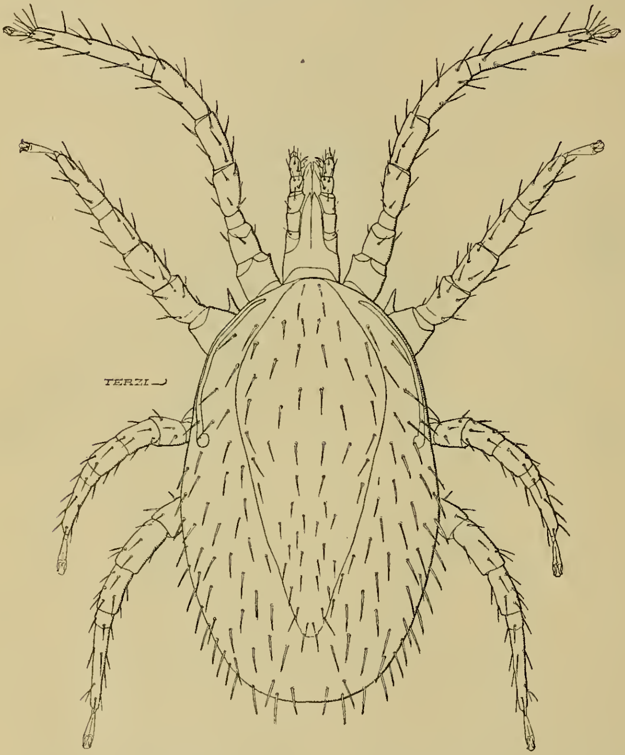


Liponyssus sternalis, sp. n., ♀. Ventral view.
a. Anterior angle of sternal plate greatly enlarged.

Liponyssus æthiopicus, sp. n. (Text-fig. 27.)

♀. *Dorsal shield* shaped as shown in text-fig. 27, being elongated and comparatively narrow; it is widest opposite the interval between the second and third legs, being narrowed anteriorly, whilst posteriorly it is still narrower gradually decreasing in width, and being rather drawn out and tapering, the end bluntly pointed. Hairs on its surface numerous; they are not very long and are usually plain, but some of them have a few inconspicuous hairlets. Hairs on uncovered part of dorsum also numerous; they are not much longer than those on the scutum, some of them are slightly bifid at the end and furnished with inconspicuous accessory hairlets, especially those at the hinder end of the body, which are also slightly stouter and blunter than the others. None of the posterior hairs are especially long. *Sternal plate* trapezoidal, not short, its surface finely reticulated; its posterior margin is much thickened and slightly concave. *Genito-ventral plate* narrowed and tapering to a point posteriorly. *Anal plate* pear-shaped. Hairs on venter rather numerous; they are finer and rather longer than those on the uncovered part of the dorsum. *Peritreme* reaching about as far forwards as the middle of the first coxa. Anteriorly the second coxa has a strong forwardly directed spine; otherwise the coxæ are devoid of spines or spurs. First leg long, especially the tarsus, the fourth legs also long; second and third legs much shorter, the former being rather stout. First free (proximal) segment of palp furnished with a process which seems rather flattened and not so spiniform as in some species.

Text-figure 27.



Liponyssus æthiopicus, sp. n., ♀. Dorsal view.

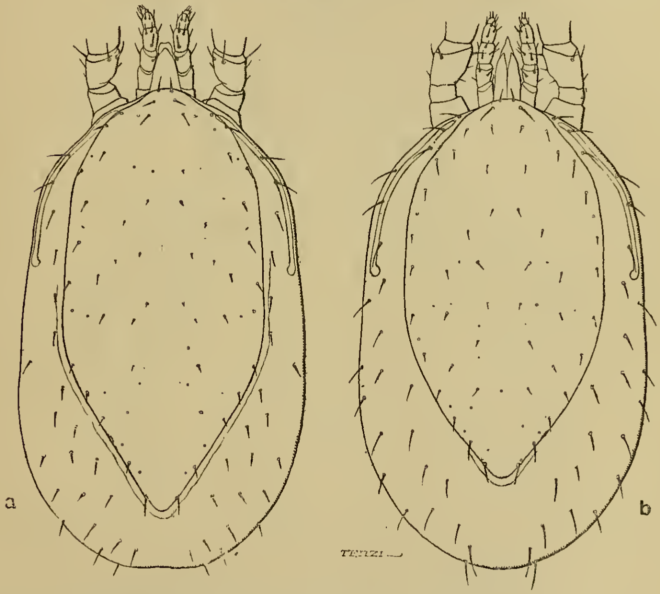
♂. *Ventral plate* with reticulate markings and rather narrow, being scarcely widened posteriorly; there are eighteen hairs on it arranged in nine pairs and also an unpaired posterior hair. The usual strong anterior spur is present on the second coxa. There is also a rather strong curved spine on the anterior margin of the third coxa. Bristles on legs mostly fine and none of them are very stout. *Peritreme* reaching the first coxa.

Note.—The male is described from specimens from the Sudan only.

Length of body (not including capitulum), ♀ ·61 mm. (distended female specimens up to ·98 mm.); ♂ ·43–·45 mm.

Hosts: Elephant shrew, Chiromo, Ruo River, Nyasaland, 1916 (*R. C. Wood*); ex Coll. of the Imperial Bureau of Entomology. Also off bats at Singa, Sennar Province, Sudan, 1913 (*Capt. W. E. Marshall*); ex the Hon. N. C. Rothschild's coll.

Text-figure 28.

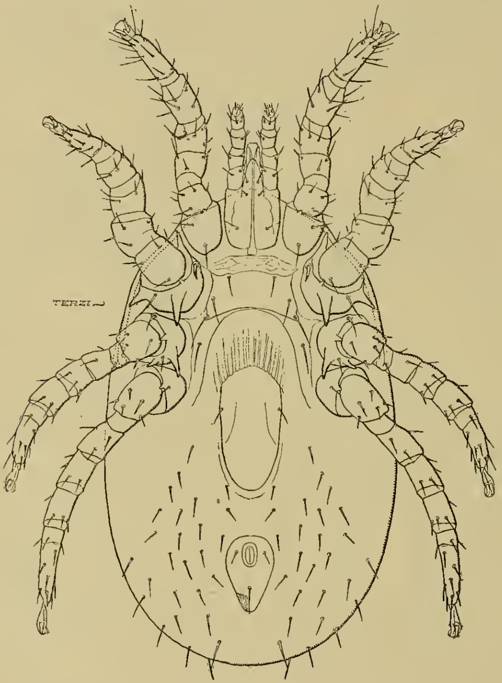


a. *Liponyssus sciurinus*, sp. n., ♀. Dorsal view.
b. *Liponyssus blanchardi* Trouessart, ♀. Dorsal view.

Liponyssus sciurinus, sp. n. (Text-figs. 28 *a*, 29.)

♀. *Body* oval, being widest some distance before the posterior end, sometimes it is slightly bilobed posteriorly. *Dorsal shield* large and undivided, being shaped as shown in text-fig. 28 *a*, posteriorly it is evenly narrowed, the end being bluntly pointed. Hairs in middle of this shield exceedingly minute and fine, even the marginal hairs are quite short, the terminal posterior pair being, however, slightly longer than the others. Hairs on uncovered part of dorsum short and fine. *Sternal plate* longer than is the case in *L. carnifex* and *L. arcuatus*, the posterior margin being only slightly concave; the three pairs of hairs on its surface are fairly long. *Genito-ventral plate* of moderate width, its posterior end rounded off. *Anal plate* pear-shaped. Hairs on venter fairly numerous. Anterior (dorsal) spur of *second coxa* well-developed; there is also a little curved hook-like spur (or rather spine for it is articulated) on the inner surface of this coxa anteriorly, and *two large spurs or teeth on the posterior margin*, the outer one being almost as large as the inner. Third coxa also with two spurs on its posterior margin, but the outer one is much weaker than the inner. *Peritreme* extending forwards as far as the middle of the first coxa or a little further forwards. There are a number of subspiniform bristles on the distal segments of the legs; the paired stout little spurs or spinules present at the distal end of the second tarsus in

Text-figure 29.

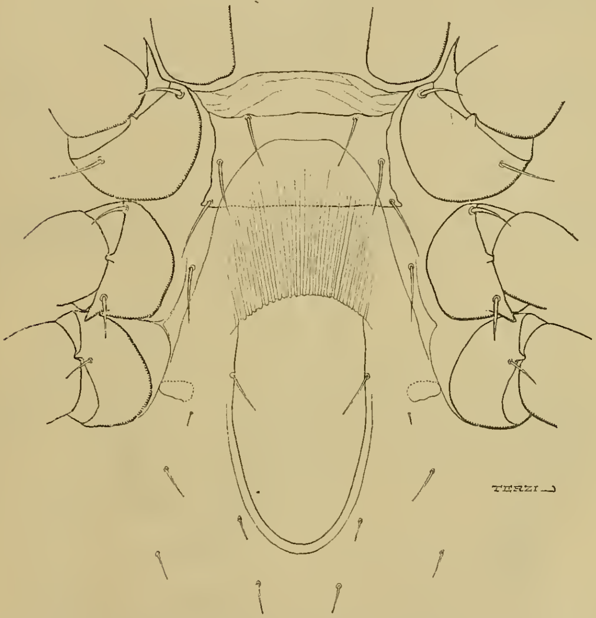


Liponyssus sciurinus, sp. n., ♀. Ventral view.

L. carnifex and *L. arcuatus* are absent in this species from squirrels.

♂. *Genito-ventral plate* rather slender and it has nine pairs of hairs on it, besides the unpaired posterior hair, it is not divided into two portions by a transverse line as is the case in *L. flavus* etc. *Peritreme* reaching as far forwards as the middle of the first coxa. Spurs and spines on the coxæ as in the female sex. At the distal end of the second tarsus there is a pair of very strong short spinules ventrally. Fourth leg not enlarged, the spiniform bristles on this limb are not very thick.

Text-figure 30.



Liponyssus blanchardi Trouessart, ♀. Ventral surface showing coxæ, sternal and genito-ventral plates.

Length, ♀ (including capitulum and palpi) ·83–·90 mm.; of body only ·73–·81 mm.; greatest width ·40–·42 mm.

♂. *Length* of body ·53 mm.; width ·31 mm.

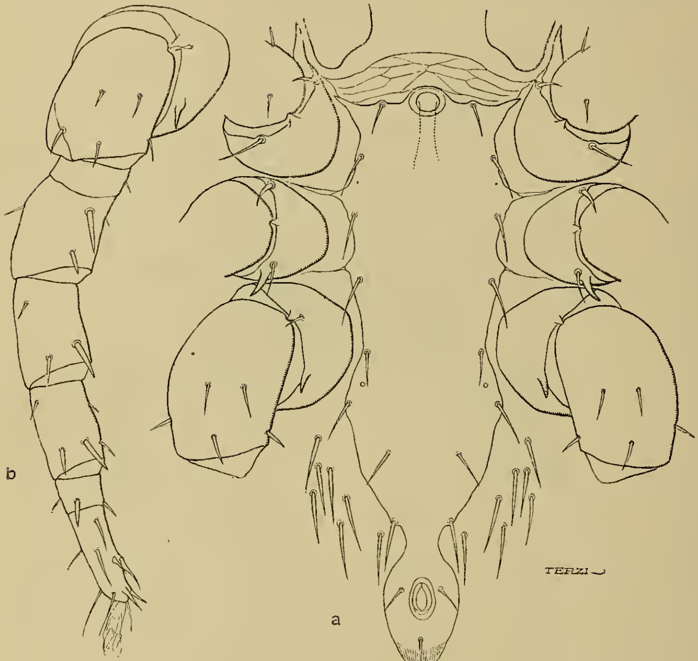
Host: Squirrels at Briançon, France (26. ix. 1887). Collection of the Paris Faculty of Medicine.

Liponyssus blanchardi Trouessart. (Text-figs. 28 *b*, 30, 31.)

Leiognathus blanchardi Trouessart, 1904, Arch. Parasit. viii. pp. 558–561, 2 text-figs.

♀. *Dorsal shield* large and undivided, narrowing posteriorly, the tip being blunt (almost pointed). Hairs on dorsal shield all short, but the marginal ones are longer than the others. Hairs on uncovered part of body about as long as the longest of the marginal hairs on the shield or somewhat longer, a few at the posterior end of the body are longer than the others, but still none of them are very long. *Sternal plate* trapezoidal, not very short, and furnished with the usual three hairs which are of moderate length; the posterior margin is straight. *Genito-ventral plate* of moderate width, the posterior end rounded off. *Anal plate* pear-shaped. Hairs on venter short and not very numerous. *Peritreme* reaching about as far forwards as the middle of the first coxa. With the exception of a distinct (outer) pointed tooth or spur on the posterior edge of the third coxa, and the usual anterior spur of the second coxa, the *coxæ* are devoid of spurs or teeth. None of the spines on the legs are very stout.

Text-figure 31.



Liponyssus blanchardi Trouessart, ♂.

a. Ventral surface showing coxæ and ventral plate.
b. Fourth leg greatly enlarged.

♂. *Ventral shield* becoming rather wide behind the last coxæ, its sides here being convex but afterwards narrowing to form the usual neck-like portion connecting with the anal part of the plate; the transverse line present on this plate in *L. flavus* and *L. granulosus* is absent in this species. There are nine pairs of hairs on the ventral plate and also the usual unpaired posterior hair. Besides these hairs on the plate itself there are a few lateral hairs posteriorly on the venter and they are fairly long. The curved anterior seta on the inner side of the third coxa is rather stout, being almost spiniform; this coxa has also a very slender outer posterior spur. Fourth coxa also usually with a very slender posterior spur. First leg more slender than the others, the second and third being short and stout; the fourth leg is enlarged as in *L. carnifex* C. L. Koch, some of the spines on this limb being rather stout, especially in the specimens from the Prairie Marmot. Second tarsus with a pair of distal spinules ventrally which are very stout and quite short.

Length. ♀ (without capitulum) ·73–·78 mm.; ♂ ·58–·63 mm.

Host: Alpine Marmot. The above description is based on a number of female specimens mounted on a slide (one of Professor Blanchard's preparations in the collection of the Paris Faculty of Medicine). Also examples of both sexes taken on marmots at Zermatt (*M. Biner*); ex N. C. Rothschild's coll. Also examples of both sexes from specimens of the Prairie Marmot (*Cynomys ludovicianus*) bred by Sir E. Loder at Leonardslee, Horsham, England.

LIPONYSSUS CONFUCIANUS, nom. nov.

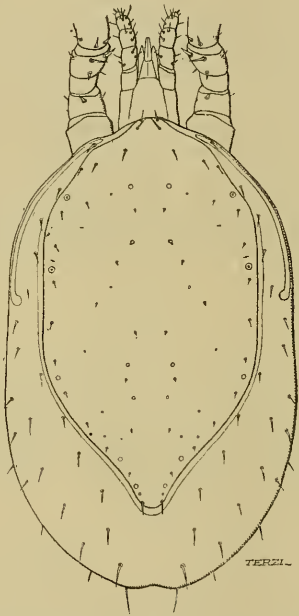
Liponyssus berlesei Hirst, Proc. Zool. Soc. 1921, p. 362.

Canestrini has already described a species of *Leiognathus* = *Liponyssus* from a bat under the name *L. berlesei* (Atti Soc. Ven. Trent. xi. pp. 142–143, 1888), so it is necessary to find a new name for my species from *Myospalax scansus*. I propose the name *L. confucianus* for this species.

LIPONYSSUS MACEDONICUS, sp. n. (Text-figs. 32, 33.)

♀. Differing from *L. sciurinus* etc. principally in the shape of the dorsal shield, which is rather abruptly narrowed at the posterior end so as to practically form a short tail. Hairs on dorsal shield exceedingly minute, a few near the anterior end on the margins being a little longer and the terminal pair at the posterior end of the shield also a little longer than the rest, but still quite short. Hairs on uncovered part of body also short, but two pairs at the posterior end (one of them ventral) are somewhat longer than the others. *Sternal plate* trapezoidal and not short, the posterior margin straight; the three pairs of hairs on this plate are rather short. *Genito-ventral plate* short and fairly wide, its posterior end rounded off. Hairs on venter a little longer than those on the dorsum. *Anal plate* rather elongate pyriform. *Peritreme* reaching almost as far forwards as the anterior margin of the first coxa. Second coxa with the anterior (dorsal) spur large, ventrally this coxa has a large posterior spur (larger than in *L. arcuatus*). Third coxa with two posterior spurs, the inner fairly well developed, the outer weaker. Fourth coxa apparently without any spur. Femur of first leg dorsally with two rather noticeable but not very long spiniform setæ near its distal end and there are also some quite short ones on this limb. Ventrally the tarsus of the second leg has two stout but very short spurs or spinules. Tarsi of third and fourth legs with a spine near the distal end. There are also some weaker spines and setæ on the legs.

Text-figure 32.



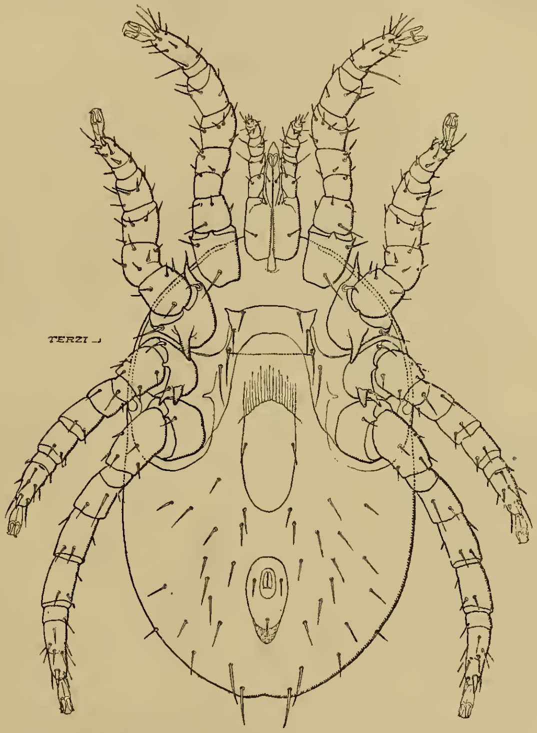
Liponyssus macedonicus, sp. n., ♀. Dorsal view.

♂. *Ventral plate* without any transverse line, it is expanded just behind the last coxæ and afterwards narrows again to form the neck-like portion connecting it with the anal part; the anal part of the plate has a very minute denticle or cone on each of its margins just before the striated tip; there are nineteen hairs on the ventral plate including the posterior unpaired one. *Coxæ* furnished with spurs as in the female, but there is also a slender (outer) spur on the last coxa. Second leg stout but rather short, the fourth leg longer than the others and considerably swollen, one of the spines on the patella and another on the tibia are stouter than the rest. A pair of spinules are present at the distal end of the tarsi of the three posterior pairs of legs.

Length of body (not including capitulum), ♀ ·65–·67 mm.; ♂ ·57 mm.

Host: *Spalax monticola thermaicus*. Doiran, Macedonia. Several specimens collected by Dr. James Waterston (24. x 1918).

Text-figure 33.



Liponyssus macedonicus, sp. n., ♀. Ventral view.

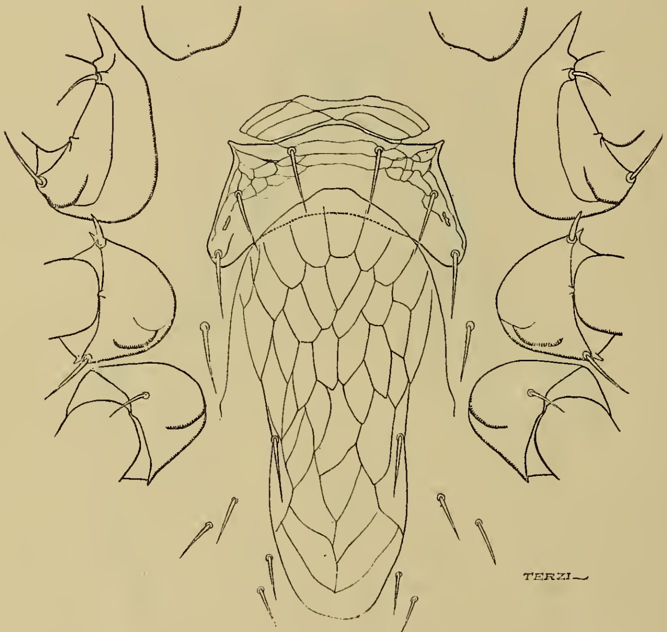
LIPONYSSUS FLAVUS Kolenati. (Text-figs. 34, 35.)

Dermanissus flavus Kolenati, Parasit. Chiropt. 1857, p. 19.

Liponyssus lobatus Oudemans, Tijdschr. Ned. Dierk. Ver. 1904, (2), pp. 18–22, pl. i. figs. 3–17.

♀. A little before the posterior end the *dorsal shield* becomes narrowed, but the tip is not pointed but widely rounded off (almost truncated) as in *L. carnifex*. Hairs on its surface very short and fine; they are not numerous and are distributed as shown in the figure. Hairs on uncovered part of dorsum very numerous, being very short and rather stiff. *Sternal plate* trapezoidal, the posterior margin being strongly concave; the three pairs of hairs on this plate shorter than its length. *Genito-ventral plate* curiously sculptured, especially the anterior part of it (genital operculum) which has scale-like markings; posterior end of this plate rounded off. *Anal plate* more triangular than pear-shaped, the sides being straighter than usual. *Venter* with numerous very short stiff hairs. *Peritreme* reaching as far as middle of the first coxa or a little further forwards. First free segment of *palp* with a large flattened process. Second coxa with the usual strong anterior spur, but without any distinct spurs or tooth-like processes posteriorly; on the outer half of its posterior border, however, it is furnished with a slight but distinct curved raised edge. Third coxa also with a slight curved raised edge posteriorly, the outer half of this coxa is somewhat produced and bears a hair. Fourth coxa with a chitinous line near the posterior margin; sometimes there is a tiny inconspicuous spine connected with an outer series of very minute denticles on the extreme outer side of this coxa, but it is

Text-figure 34.

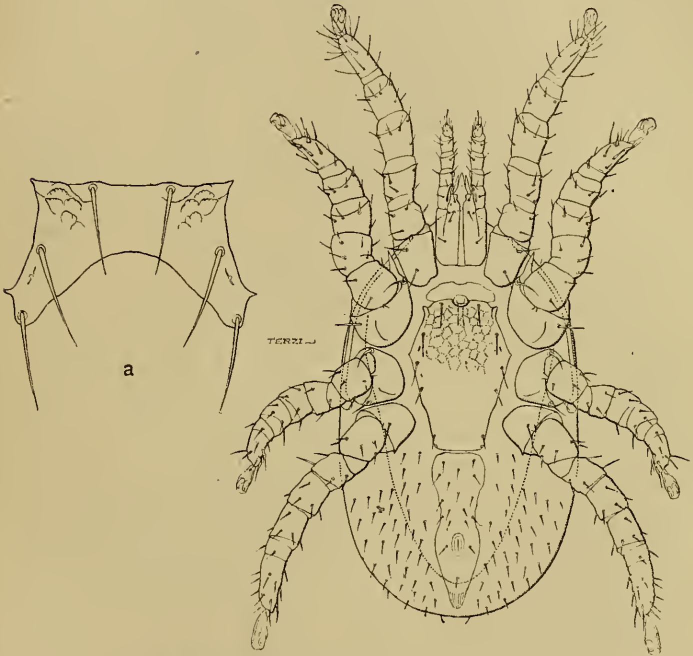


Liponyssus flavus Kolenati, ♀. Ventral surface showing coxæ, sternal and genito-ventral plates.

easily overlooked. There are some rather thick spiniform setæ on the dorsal surface of the legs, those on the femora being especially noticeable.

♂. Posterior end of *dorsal shield* narrowed and angular, being almost pointed, but blunt instead of rounded off as in *L. granulosus*. *Ventral plate* divided into two regions by a transverse line as in *L. granulosus*. There are five pairs of hairs on the anterior part of this plate and eighteen hairs on the posterior part of it. Hairs on venter numerous and quite short. *Peritreme* apparently somewhat longer than in the male of *L. granulosus*, almost reaching the middle of the first coxa. Fourth leg not specially enlarged.

Text-figure 35.



Liponyssus flavus Kolenati, ♂. Ventral view.
a. Sternal plate of *Liponyssus granulosus* Kolenati, ♀.

Length of body (not including capitulum), ♀ ·65 mm.; ♂ ·54 mm

Host: Bats. The above description is based on Kolenati's types in our collection labelled *Dermanissus flavus* There are also specimens from a Noctule bat, Aylesford, Kent (27. x. 1919), collected by the author.

Liponyssus granulosus Kolenati.

Dermanissus granulosus Kolenati, Parasit. Chiropt. 1857, p. 20.

Dermanissus glutinosus Kolenati, ib. p. 20.

♀. Dorsal plate rather like that of *L. flavus* in shape. The hairs on its surface very minute, those on the anterior margin longer, however. *Sternal plate* trapezoidal in shape, the posterior margin strongly concave; in the anterior angle of this plate there are a few rather deep impressions or markings, the rest of its surface being practically smooth and without sculpturing; the three pairs of hairs on this plate are longer than in *L. flavus*, being longer than the plate itself. *Genito-ventral plate* with the markings on its surface very similar to those present in *L. flavus*, the posterior end is rounded off. *Anal plate* pear-shaped, the sides being more convex than in *L. flavus*. *Venter* with numerous short hairs, which are slightly longer than in *L. flavus*. *Peritreme* reaching as far forwards as the middle of the first coxa or slightly further. First free segment of *palp* with a large flattened process as in *L. flavus*. Coxæ of legs very like those of *L. flavus*, the second and third having slight raised curved edges posteriorly, which perhaps represent obsolete spurs.

♂. Posterior end of *dorsal shield* wider and rounded off posteriorly (instead of almost angular and bluntly pointed as in *L. flavus*). Two of the hairs at the posterior end of this shield are much longer than the others. Hairs on uncovered part of dorsum very sparse. *Ventral plate* divided into two regions by a strong transverse line (situate almost opposite the posterior end of the last coxæ). Hairs on the posterior part of this plate less numerous than is the case in *L. flavus* and slightly longer than in that species. There are five pairs of hairs on the anterior part of it as in *L. flavus*, but only 9–10 on the part of it situated behind the transverse line and they are arranged regularly in pairs (whereas there are eighteen on this part of the ventral plate in *L. flavus*). Hairs on venter few in number and slightly longer than those of *L. flavus*. *Peritreme* shorter than in the female, apparently only reaching a little further than the middle of the second coxa. Last pair of legs not enlarged and the bristles and spines are not very stout.

Chelicera furnished with a rather long pointed process besides the two short fingers.

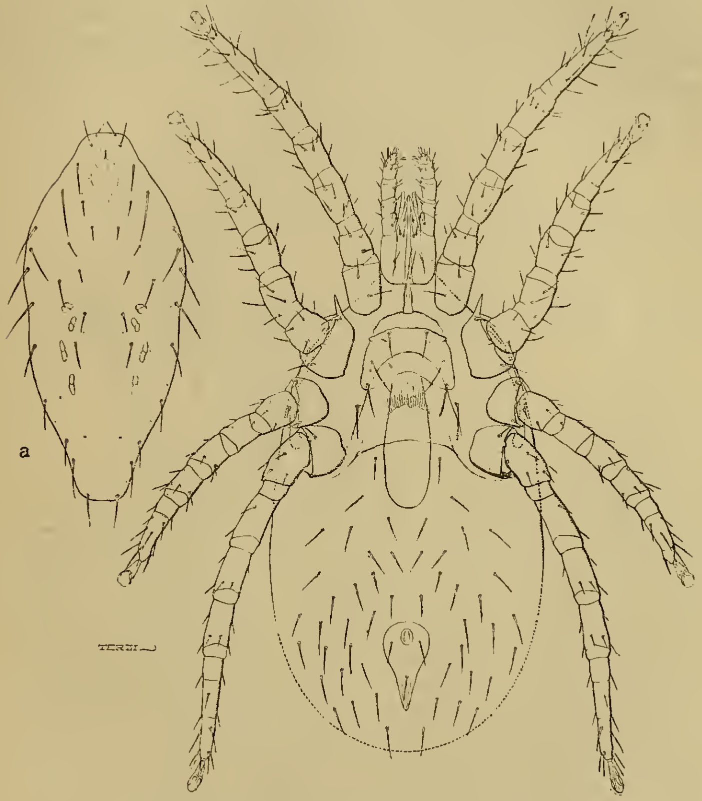
Length of body (not including capitulum), ♀ ·63–·68 mm.; ♂ ·55 mm.

[Note.—The male of this species is described from a single example of this sex from the tube labelled *L. glutinosus* by Kolenati, for there were no males in the tube labelled *L. granulosus*.]

Host: Bats. Two tubes (each containing a few specimens) labelled *Dermanissus granulosus* and *Dermanissus glutinosus*. They bear the British Museum Register no. 56.163 (December,

1856) and are described in the register as types presented by Prof. Kolenati. We have also specimens of this species taken on *Vespertilio myotis* at Begamo, ex N. C. Rothschild's collection.

Text-figure 36.



Liponyssus ellipticus Kolenati, ♀. Ventral view.
a. Dorsal shield of same.

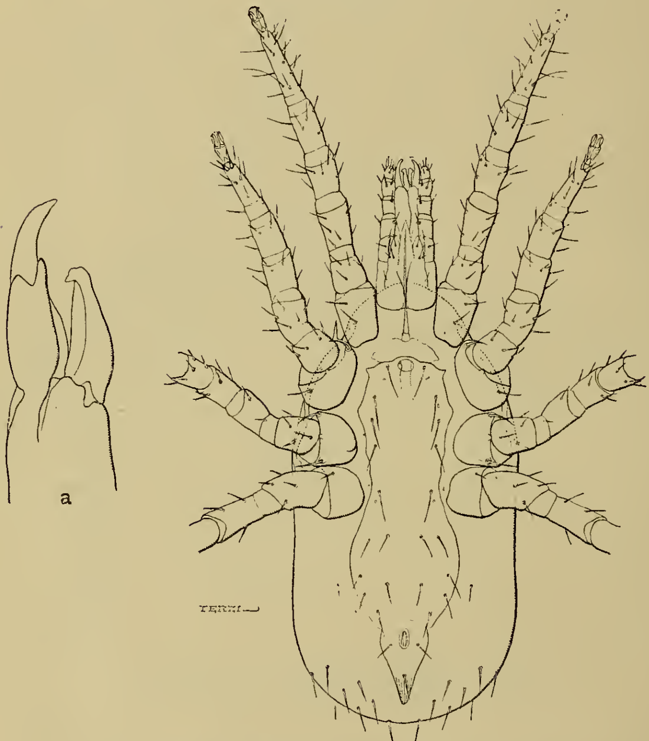
LIPONYSSUS ELLIPTICUS Kolenati. (Text-fig. 36.)

Caris elliptica Kolenati, Parasit. Chiropt. p. 16 (1857).

♀. Size large for a *Liponyssus*. *Dorsal shield* more elongated and narrower as compared with its width than that of *L. granulosus* Kolenati, posteriorly it is narrowed, the end being practically truncate; the hairs on the posterior part of the scutum, especially the marginal ones, are much longer than in that species. Hairs on softer uncovered part of dorsum fairly numerous and of moderate length. *Sternal plate* rather large, being longer than that of *L. granulosus*, its posterior margin is concave and not thickened;

the three pairs of hairs on it fairly long. *Genito-ventral plate* with the posterior end rounded off, and it only bears a single pair of hairs. *Anal plate* pear-shaped, the sides of the anterior part of it being well curved, whilst the pointed posterior end is elongated. *Peritreme* rather short. First free segment of *palp* with a process ventrally. Anterior surface of *second coxa* with a long slender spur; except for this one, the coxæ are entirely devoid of spurs or spines. Numerous fine setæ are present on the legs.

Text-figure 37.



Liponyssus longimanus Kolenati, ♂. Ventral view.
a. Chelicera of same.

Length (owing to the damaged condition of the unique specimen it is impossible to give the exact length).

Host: The name of the host is not given on the label, but Kolenati gives it as *Myotis murinus* in the work quoted above.

LIPONYSSUS LONGIMANUS Kolenati. (Text-fig. 37.)

Caris longimana Kolenati, Parasit. Chiropt. p. 16 (1857).

♂. *Dorsal shield* with faint reticulate or scale-like markings;

its posterior end is narrowed and practically truncate, the hairs on its surface are not very long, one or two of the marginal ones posteriorly are a little longer, however, and the pair at the end considerably longer than the others. *Ventral plate* with about twenty-five hairs on its surface, including the posterior unpaired one; it becomes greatly enlarged in width behind the last coxæ and is not divided by any transverse line. Hairs on *venter* very few in number and of moderate length (not very long). Movable finger of *chelicera* only about half the length of immovable one. *Peritreme* short, only reaching the second coxa. With the exception of a long slender spur on the anterior surface of the second coxa, the coxæ are without spurs or spines.

Length of body (without capitulum) ·59 mm.

Host: The name of the host is not mentioned on the label, Kolenati says the species is found on *Miniopterus schreibersii* and *Rhinolophus clivosus*.

Note.—It seems probable to me that this mite is the male of *Liponyssus ellipticus* Kolenati, but it is better to keep the names separate until proof of this is forthcoming.

Family TARSONEMIDÆ.

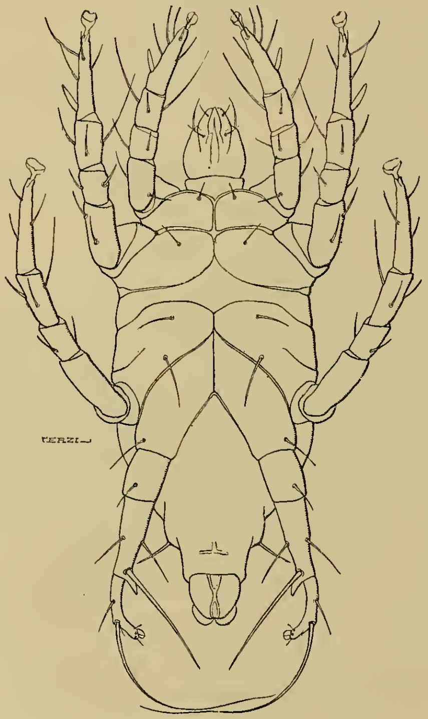
Genus TARSONEMUS Can. & Fanz.

TARSONEMUS TRANSLUCENS Green. (Text-figs. 38, 39, 40.)

♂. *Body* of the male rather long and narrow, being more than twice as long as its greatest width; it is widest at the point at which the posterior pairs of legs are inserted, this part of the abdomen being slightly wider than the cephalothorax. Posterior end of abdomen narrowed and rather tail-like, each of the last segments being considerably narrower than its predecessor. The curious anal structure at the extreme end of the body is only 20 μ wide, the segment preceding it 27–30 μ wide, and the third from the end 40–50 μ wide. When viewed laterally the body is seen to be very high at the level of the posterior legs, but anteriorly it is much lower and the abdomen is narrowed posteriorly as noted above. Hairs on body all rather short. *Legs*. Second leg a little longer than the first and the third is the longest. Fourth leg really the shortest, but its position at the highest and widest part of the body makes it appear longer than the first and second legs: this leg is stouter than the others and its penultimate segment has an angular internal spur or process distally, there is also a long stout bristle situated near it; fourth tarsus curved or bent and a little beyond the middle of its length it is furnished with a very long fine hair, after which the segment becomes slightly reduced in width. Tarsus of the three first legs with a pulvillus, but the terminal segment of the fourth has only a short knob-like structure at the end, it is possible that this is the rudimentary tarsus. There is a stout striated sensory seta on the anterior tarsi, that on the second tarsus being larger than the one on the first. There are also four slender but stiff sensory setæ on the first tarsus.

♀. Body oval, being considerably longer than wide. Hairs on body few in number and quite short and inconspicuous. Pseudostigmata almost circular in shape. First leg the shortest, being slightly shorter than the second. Claw of first tarsus rather large and only slightly curved. The largest of the striated olfactory setæ on this segment is long but slender and situated near the middle, there are also two short striated setæ of the same nature near the proximal end, one of them being club-shaped. In addition to the fairly stout setæ just mentioned there are two pairs of long slender tactile setæ. Second tarsus with a rather long striated seta near its proximal end, but it is a little shorter than the longest of the stout ones on the first tarsus.

Text-figure 38.



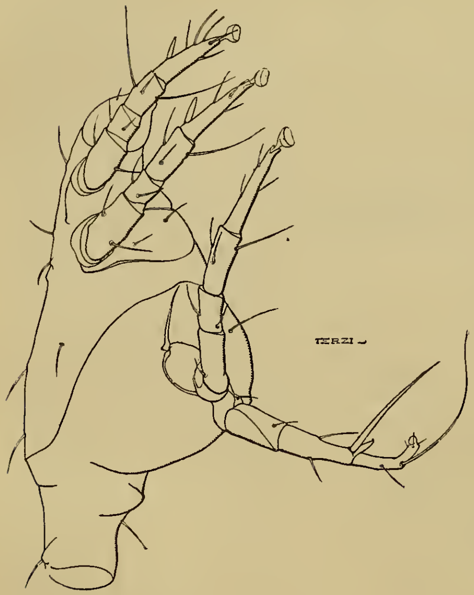
Tarsonemus translucens Green, ♂. Ventral view.

Measurements. ♂. Body (including capitulum) 157–167 μ in length; width of cephalothorax 72–75 μ; greatest width of abdomen about 80 μ. Length of first leg 75 μ, of second 96 μ, of third 122 μ, of fourth (not including the proximal segment) 72 μ.

♀. Body 190–207 μ in length; in width 107–115 μ.

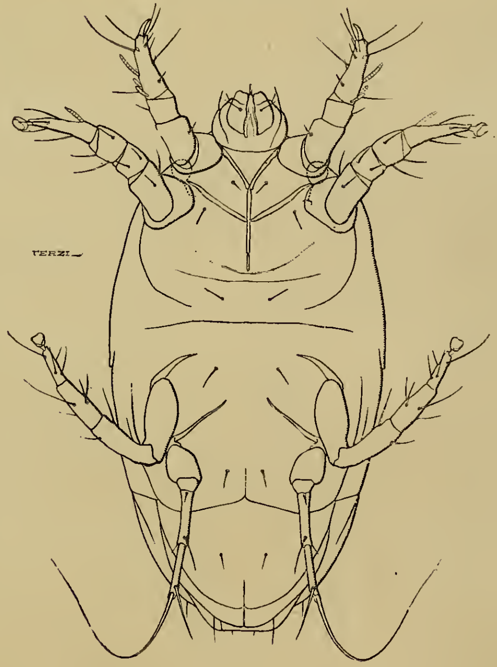
Hab. On *Capsicum*, Trinidad (*F. W. Urich*). On tea, Ceylon (*Hutson*).

Text-figure 39.



Tarsonemus translucens Green, ♂. Lateral view.

Text-figure 40.



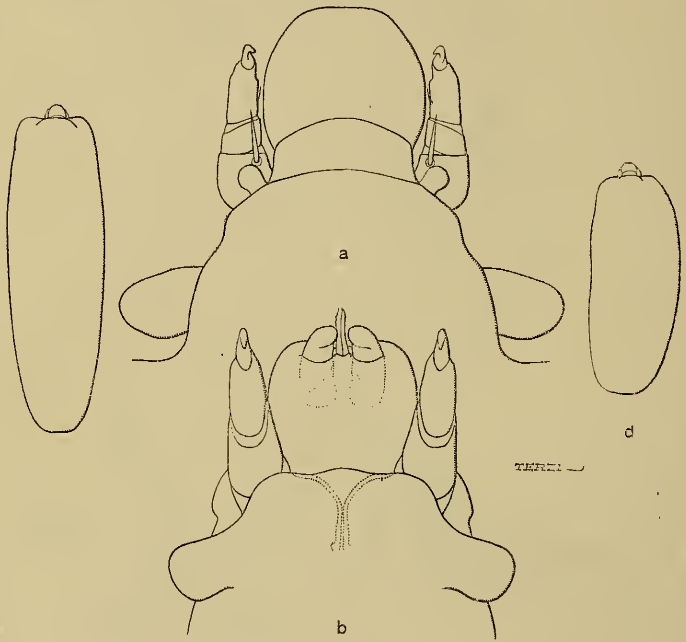
Tarsonemus translucens Green, ♀. Ventral view.

Genus PODAPOLIPUS Grassi & Rovelli.

PODAPOLIPUS AHARONII, sp. n. (Text-fig. 41.)

♀. Body elongated, being from over three to more than three and a half times as long as wide. There are usually a large number of embryos or eggs in the body. Cephalothorax minute and bearing the appendages. Anterior pair of legs minute but segmented, the segments apparently being three in number; a seta is present dorsally at the distal end of the first segment of this leg; the terminal segment has a well-curved hook-like claw at the end. Second pair of legs reduced to smooth little unsegmented sacs. Just above the first leg there is a tiny cone or tubercle at the apex of which is the stigmal orifice. Movable finger of chelicera curved and styliform, being quite slender.

Text-figure 41.



Podapolipus aharonii, sp. n., ♀.

a. Dorsal view of capitulum and anterior end of body showing the legs, etc.
b. The same from below.
c & **d.** Outline of body of the entire mite showing variation in length.

This species is much more elongated than *P. reconditus* Grassi & Rovelli and *P. grassii* Berl., resembling *P. bacillus* Berl.

(from Java) in this respect, but *Opsomala cylindrica*, the host of the new species described above, is confined to the Mediterranean Region.

Length of body 122–171 μ, its width 40–49 μ.

Host: A number of specimens from the wings of *Opsomala cylindrica* Marsch., Ekron, Palestine, 15. iii. 1921 (*I. Aharoni*).

The specimens were red in colour when alive.

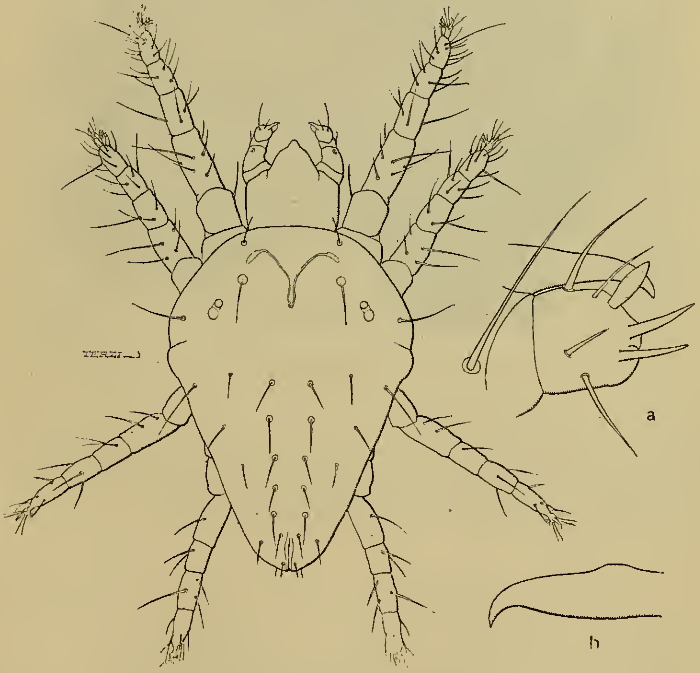
Fam. TETRANYCHIDÆ.

Genus PARATETRANYCHUS Zacher.

PARATETRANYCHUS TRINITATIS, sp. n. (Text-figs. 42, 43.)

♂. Hairs on *body* quite short, they are distributed as shown in the figure, some of them seem plain, but others are furnished with inconspicuous accessory hairlets. Anterior eye distinct although small, the posterior is inconspicuous and easily overlooked, being more weakly chitinised. *Penis* curved at the end

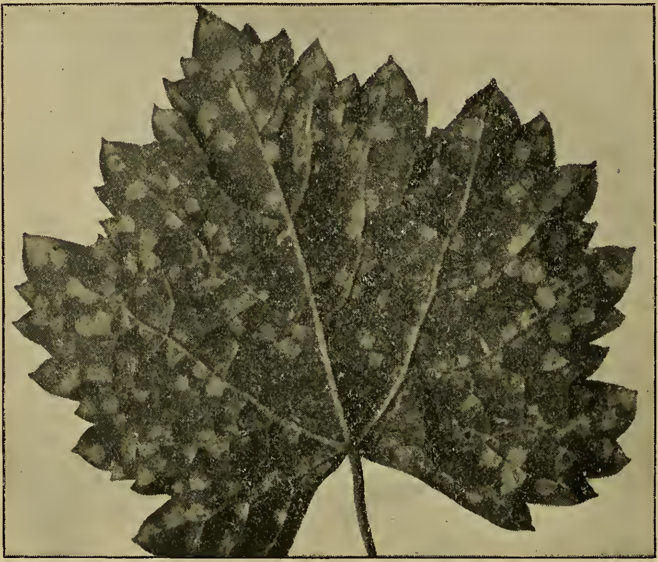
Text-figure 42.



Paratetranychus trinitatis, sp. n., ♂. Dorsal view.
a. Traces of palp. b. Penis from the side, greatly magnified.

and shaped as figured. Dorsal spine on *palp* very short. Dorsal sensory finger stouter than and a little shorter than the two neighbouring rod-like setæ, the latter are of unequal length, one being slightly longer than the other. Terminal sensory finger of palp apparently absent.

Text-figure 43.



Leaf of vine showing discoloration caused by *Paratetranychus trinitatis*, sp. n.

Length of male (including capitulum) 342–375 μ, of hard external part of penis about 11–15 μ, of rod-like setæ of tarsus of palp 4½–6 μ, of dorsal sensory finger of palp 3½–4 μ.

Host plant: Grape vine, Trinidad (*F. W. Urich*).